



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/786,745 | 02/25/2004 | Pi-Chuan Su | DEE-PT154 | 2996 |
| 3624 | 7590 | 04/17/2006 | EXAMINER | |
| VOLPE AND KOENIG, P.C. UNITED PLAZA, SUITE 1600 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103 | | | PATEL, ISHWARBHAI B | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2841 | |

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/786,745

Applicant(s)

SU, PI-CHUAN

Examiner

Ishwar (I. B.) Patel

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because the figures are improperly cross hatched. All of the parts shown in section, and only those parts, must be cross-hatched. The cross-hatching patterns should be selected from those shown on page 600-114/115 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP § 608.02.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following: The specification fail to explain in sufficient detail "the **pitch** of the **conductive film layer** is broadened to be ranged from 0.5 to 3.0 mm. The applicant referred this characteristic at various places in the abstract, in the background of invention, in the summary of the invention and the detail description, including the claims but does not describe the detail about the pitch of the conductive film. It is not clear from the specification what is referred to as the pitch of the conductive film.

The specification must include a written description of the invention or discovery and of the manner and process of making and using the same, and is required to be in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention or discovery appertains, or with which it is most nearly connected, to make and use the same, (see 37CFR, 1.71 (a)), and

the claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description (see 37 CFR, 1.75 (d)).

Appropriate correction is required.

Claim Objections

3. Claims 1-20 are objected to because of the following: Regarding claims 1 and 14, "a pitch of said conductive film layer is broadened to be ranged from 0.5 mm to 3.0

Art Unit: 2841

mm" is unclear. The conductive film layer may have a thickness which can be reduced or the conductive film may have conductive particles which may be pressed by the pressure while bonding, but the concept of broadening the pitch of the conductive film layer is not clear. For the examination purpose, based on the disclosure, the conductive film considered to be comprising conductive particles whose size (in one dimension) may be broadened.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-10, 12-14 and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda (US Patent No. 6,952,250) in view of Imaeda (US Patent No. 6,729,888) and Nakamura (US Patent No. 6,211,936).

Regarding claim 1, Ueda, in figure 1-3, discloses a flexible printed circuit board (6) comprising: a substrate layer (11); at least a circuit layer (10) formed on said substrate layer; and a conductive film layer (3) formed on one end of said circuit layer. Ueda does not explicitly disclose the detail of the conductive particles and broadening of the conductive particles of the film layer. However, Ueda discloses the conductive film

Art Unit: 2841

comprising the conductive particles and the bonding is carried out by pressure and heat, (column 1, line 32-45).

Imaeda discloses connecting structure and recites conductive particles comprising plastic ball plated with Ag, Ni or Ni-Au for electrical and mechanical connection (column 7, line 9-12).

Nakamura discloses a Liquid Crystal Display device having an anisotropic conductive film (ACF 6) with metal-coated plastic ball (column 4, line 39-41) as conductive particles for connecting the flexible circuit board (5, figure 1).

As the bonding is taking place by applying pressure and heat, the conductive particles will be broaden opposite to the thickness direction (thickness of the conductive film) and the broadening will be to a desired value for a reliable electrical connection with respective connection pattern.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified structure of Ueda with the conductive film having conductive particles as taught by Imaeda and Nakamura, which will broaden to a desired value on applying pressure and heat, in order to have reliable electrical and mechanical connection.

Regarding claim 3, the modified circuit board structure of Ueda further discloses said conductive film comprises conductive particles and sticky polymers as applied to claim 1 above (column 1, line 32-34).

Regarding claim 4, the modified circuit board structure of Ueda further discloses said conductive particles made of metal-plated polymer particles as applied to claim 1 above (as recited by Imaeda and Nakamura).

Regarding claim 5, the modified circuit board structure of Ueda further discloses said metal of said metal-plated polymer particles is gold as applied to claim 1 above (as recited by Imaeda and Nakamura).

Regarding claim 6, the modified circuit board structure of Ueda further discloses said substrate layer is a plastic layer (Ueda, column 2, line 63-64).

Regarding claim 7, the modified circuit board structure of Ueda further discloses said plastic layer comprises a polyimide layer and an epoxy resin layer (resin layer 9).

Regarding claim 8, the modified circuit board structure of Ueda further discloses said plastic layer comprises a polyimide layer (Ueda, column 2, line 63-64).

Regarding claim 9, the modified circuit board structure of Ueda further discloses said circuit layer is a copper circuit layer (column 2, line 63).

Regarding claim 10, the modified circuit board structure of Ueda further discloses an integrated circuit (5) disposed thereon which is packaged a chip on film.

Regarding claim 12, the modified circuit board structure of Ueda further discloses said conductive film is an anisotropic conductive film as applied to claim 1 above (column 1, line 31-33).

Regarding claim 13, the modified circuit board structure of Ueda further discloses said flexible circuit board is connected to a liquid crystal display (2) via said conductive film layer.

Regarding claim 14, Ueda, in figure 1-3, discloses a flexible printed circuit board (6) comprising at least two substrate layer (8 and 11); at least a circuit layer (10) formed between every adjacent two said substrate layer; and at least a conductive film layer (3) formed on one end of said circuit layer. Ueda does not explicitly disclose the detail of the conductive particles and broadening of the conductive particles of the film layer. However, Ueda discloses the conductive film comprising the conductive particles and the bonding is carried out by pressure and heat, (column 1, line 32-45).

Imaeda discloses connecting structure and recites conductive particles comprising plastic ball plated with Ag, Ni or Ni-Au for electrical and mechanical connection (column 7, line 9-12).

Nakamura discloses a Liquid Crystal Display device having an anisotropic conductive film (ACF 6) with metal-coated plastic ball (column 4, line 39-41) as conductive particles for connecting the flexible circuit board (5, figure 1).

As the bonding is taking place by applying pressure and heat, the conductive particles will be broaden opposite to the thickness direction (thickness of the conductive film) and the broadening will be to a desired value for a reliable electrical connection with respective connection pattern.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified structure of Ueda with the conductive film having conductive particles as taught by Imaeda and Nakamura, which will broaden to a desired value on applying pressure and heat, in order to have reliable electrical and mechanical connection.

Regarding claim 16, the modified circuit board structure of Ueda further discloses said conductive film comprises conductive particles and sticky polymers (column 1, line 32-34).

Regarding claim 17, the modified circuit board structure of Ueda further discloses said conductive particles made of metal-plated polymer particles as applied to claim 1 above (as recited by Imaeda and Nakamura).

Regarding claim 18, the modified circuit board structure of Ueda further discloses said metal of said metal-plated polymer particles is gold as applied to claim 1 above (as recited by Imaeda and Nakamura).

Regarding claim 19, the modified circuit board structure of Ueda further discloses said substrate layer is a plastic layer (Ueda, column 2, line 63-64).

6. Claims 2, 11, 15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified circuit board structure of Ueda, as applied to claim 1 and 14 above, and further in view of Oishi (US Patent No. 6,831,841).

Regarding claims 2 and 15, the modified circuit board structure of Ueda discloses all the features of the claimed invention including the other end of said circuit layer electrically connected to the LCD circuit board (7) as applied to claim 1 and 14 respectively, but does not explicitly disclose the circuit pattern connection portion comprise gold. However, it is old and known in the art to gold plate the connection region for reliable electrical connection. Oishi discloses an electro-optical device with flexible substrate with gold plating (column 7, line 28-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the circuit board structure of Ueda with the other end connection pattern with gold plating as claimed in claim 2 and 15, as taught by Oishi, to have reliable electrical connection as is old and known in the art.

Regarding claim 11 and 20, the modified circuit board structure of Ueda discloses all the features of the claimed invention as applied to claims 1 and 14 above including an integrated circuit device as applied to claim 10 above, but does not disclose plurality of devices as claimed in claim 11 and 20. However, it is old and known

Art Unit: 2841

in the art to provide additional devices such as resistors and capacitors on the board along with integrated devices for the operation of the system. Oishi discusses a device with flexible substrate having a driver IC (26, figure 1) along with driver controlling electronic component group (22, figure 1) for the operation of the system (column 7, line 28-37).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified circuit board structure of Ueda with plurality of devices as claimed in claim 11 and 20, as taught by Oishi, in order to operate the system.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tagusa (US Patent No. 5,668,700), in figure 1 and 4, discloses a flexible circuit board (40) with the wiring pattern (5a, 5b) for input/output connection having gold plating (column 10, line 40-60).

Murakami (US Patent No. 6,525,718), in figure 1, discloses flexible circuit boards (5) connected to a liquid crystal display (9) on one side and a circuit board (6) on the other side.

Art Unit: 2841

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ishwar (I. B.) Patel
Patent Examiner
Art Unit: 2841
April 14, 2006